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| 10/085,074 | 03/01/2002 | Chun-Hung Lin | BHT-3111-239 | 9127 |

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| EXAMINER | |
|---|---|
| WILKINS III, HARRY D | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1742 | |

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/085,074 | LIN ET AL. | |
| | Examiner | Art Unit | |
| | Harry D Wilkins, III | 1742 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *02 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *19-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. The objection to the specification has been withdrawn in view of the substitute specification filed on 2 January 2004.

2. The objections to the claims have been withdrawn in view of Applicant's amendment.

### *Drawings*

3. The proposed drawing correction was received on 2 January 2004. This drawing change is accepted.

### *Double Patenting*

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 19-26 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of US Patent No. 6,660,138 (published patent corresponding to US Application 10/076,289) in view of Perline (US 5,099,216). Claim 1 of 6,660,138 discloses an electropolishing means including at least one electrode having a cable bounded to the electrode and an axial

drive mechanism and (per claim 10) a plurality of partitions as needed. The at least one electrode is connected at a first end to the cable and at a second end to the first partition. The apparatus is placed inside a long tube for electropolishing the inner surface. Though the claim does not recite that the cable is hooked up to a power source, it would have been obvious to one of ordinary skill in the art to have supplied the necessary electricity at the electrode through the cable (see e.g.-means disclosed by Lorincz et al in Fig. 1). Claim 1 does not disclose the fixed magnet mechanism, the driving apparatus with electromagnets and the axial drive mechanism moving the driving apparatus.

Perline teaches (see abstract and col. 2, line 52-col. 4, 9) means for controlling the positioning/motion of an object through use of magnetic levitation. The means include a fixed magnet set on the object to be manipulated and a set of adjustable electromagnets surrounding the object to be manipulated. These means allow for reduction of friction and wear and also permit precise control of the positioning of tools. The means provide for motion in any direction and rotation about any axis.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the magnetic levitation means of Perline into the apparatus of 6,660,138 because the magnetic levitation means reduce friction and wear and allow for precise control of tool positioning, thus providing a more accurate electropolishing method.

It would have been within the expected skill of a routineer in the art to set-up the magnetic levitation means of Perline for the task of moving the electrode of 6,660,138 by including a set of fixed magnets on the electrode (the object to be manipulated) in

any desired orientation to ensure 360° magnetic force, such as by using a plurality of magnets positioned with a long side parallel with an axis of the long tube, and providing a set of electromagnets outside the tube (surrounding the object to be manipulated) for the purpose of moving the electrode. This is equivalent to the presently claimed driving mechanism. The electromagnets require a power source of their own, thus necessitating a second power source. One of ordinary skill in the art would have been motivated to add an axial driven mechanism for moving the electromagnets up and down the tube because the range of the magnetic interaction would not extend the length of the tube, and thus, the electromagnets would have to be moved with the magnets on the electrode.

Regarding claim 20, claim 7 of 6,660,138 teaches using an insulating material for the partition.

Regarding claim 21, claim 1 of 6,660,138 teaches using a plurality of slots at the edges of the partitions for more fluent introduction of the electrolyte.

Regarding claim 22, claim 1 of 6,660,138 teaches using a plurality of mesh holes in the partitions for more fluent introduction of the electrolyte.

Regarding claims 23 and 24, claims 1 and 8 of 6,660,138 teach the screw mechanism (propeller) for fast removal of air bubbles.

Regarding claim 25, Perline teaches (see col. 2, line 52-col. 4, line 9) that the driving apparatus (the electromagnets) is powered by a power device. It would have been within the expected skill of a routineer in the art to have "driven" the electromagnets to keep them in position with the fixed magnet mechanism in order to

maintain the magnetic levitation effect. Though the claims of 6,660,138 are silent about the rotation of electrode, Perline teaches that the means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to cause the electrode (by means of the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing by ensuring that any defects of the electrode are not concentrated in one spot thus forming a groove in the tube surface.

Regarding claim 26, Perline teaches (see col. 2, line 52-col. 4, line 9) that the magnetic levitation means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to rotate the driving apparatus "by direct mechanical transmission" to cause the electrode (with the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing (by ensuring that any defects of the electrode are not concentrated in one spot thus forming a groove in the tube surface).

[This rejection takes the place of the previous provisional grounds due to the publication of US Patent No. 6,660,138 based upon the 10/076,289 Application.]

6. Claims 27-35 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of US Patent No. 6,660,138 (published patent corresponding to US Application 10/076,289) in view of Perline (US 5,099,216), Aiura et al (EP 951960) and Sakata et al (US 4,561,185).

The teachings of 6,660,138 and Perline are discussed above in paragraph no. 5. However, 6,660,138 and Perline do not teach plural closed fillisters being placed on the

second partition, wherein the fillister includes a flexible element and a protruding object supporting an abrasive for grinding the inner surface.

Aiura et al teach (see Fig. 3 and paragraph 37) the grinding of the inner surface of a tube by means of abrasives that are pushed against the inner surface.

Sakata et al teach (see col. 6, lines 34-59) using a thimble and spring set-up to apply a constant pressure.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a grinding apparatus, such as that disclosed by Aiura et al to the apparatus of 6,660,138 and Perline located on the second partition because the apparatus of Aiura et al provides for (see abstract) high precision polishing, and it would have been obvious to one of ordinary skill in the art to have used the thimble and spring set-up (fillister) of Sakata et al to apply pressure behind the abrasive elements because the thimble-spring provides a constant pressure thus making the grinding more uniform.

Regarding claim 28, claim 7 of 6,660,138 teaches using an insulating material for the partition.

Regarding claim 29, claim 1 of 6,660,138 teaches using a plurality of slots at the edges of the partitions for more fluent introduction of the electrolyte.

Regarding claims 30 and 31, Sakata et al teach (see col. 6, lines 34-59) using a spring and thimble set-up.

Regarding claim 32, though Aiura et al do not teach the composition of the abrasive, it would have been within the expected skill of a routineer in the art to have

chosen a conventional abrasive, such as alumina ($Al_2O_3$). (For support see paragraph spanning cols. 5 and 6 of Tomari et al.)

Regarding claim 33, Perline teaches (see col. 2, line 52-col. 4, line 9) that the driving apparatus (the electromagnets) is powered by a power device. It would have been within the expected skill of a routineer in the art to have "driven" the electromagnets to keep them in position with the fixed magnet mechanism in order to maintain the magnetic levitation effect. Though the claims of 6,660,138 are silent about the rotation of electrode, Perline teaches that the means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to cause the electrode (by means of the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing by ensuring that any defects of the electrode are not concentrated in one spot

Regarding claim 34, Perline teaches (see col. 2, line 52-col. 4, line 9) that the magnetic levitation means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to rotate the driving apparatus "by direct mechanical transmission" to cause the electrode (with the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing (by ensuring that any defects of the electrode are not concentrated in one spot thus forming a groove in the tube surface).

Regarding claim 35, claim 1 of 6,660,138 teaches using a plurality of mesh holes in the partitions for more fluent introduction of the electrolyte.

[This rejection takes the place of the previous provisional grounds due to the publication of US Patent No. 6,660,138 based upon the 10/076,289 Application.]

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 19-22, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lorincz et al (US 5,958,195) in view of Pelrine (US 5,099,216).

Lorincz et al (see abstract, Figures 1 and 3 and col. 2, line 38-col. 3, line 20) teach an electroplating means for an inner surface of a long tube, which is applied to polish the inner surface of the long tube which contains at least one electrode (504) having a cable (80) on one end of the electrode connecting the electrode to a first power source (92), and contains at least two partitions (512) being placed on either side of the electrode. The electrode and partitions are in cooperation with an axial driving mechanism (84) for moving the assembly up and down the tube.

Lorincz et al do not teach a fixed magnet mechanism attached to the electrode and placed between two of the partitions, nor a driving apparatus having plural outer electromagnets nor an axial drive mechanism for moving the driving apparatus.

Perline teaches (see abstract and col. 2, line 52-col. 4, 9) means for controlling the positioning/motion of an object through use of magnetic levitation. The means include a fixed magnet set on the object to be manipulated and a set of adjustable

electromagnets surrounding the object to be manipulated. These means allow for reduction of friction and wear and also permit precise control of the positioning of tools. The means provide for motion in any direction and rotation about any axis.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the magnetic levitation means of Perline into the apparatus of Lorincz et al because the magnetic levitation means reduce friction and wear and allow for precise control of tool positioning, thus providing a more accurate electropolishing method.

It would have been within the expected skill of a routineer in the art to set-up the magnetic levitation means of Perline for the task of moving the electrode of Lorincz et al by including a set of fixed magnets on the electrode (the object to be manipulated) in any desired orientation to ensure 360° magnetic force, such as by using a plurality of magnets positioned with a long side parallel with an axis of the long tube, and providing a set of electromagnets outside the tube (surrounding the object to be manipulated) for the purpose of moving the electrode. This is equivalent to the presently claimed driving mechanism. The electromagnets require a power source of their own, thus necessitating a second power source. One of ordinary skill in the art would have been motivated to add an axial driven mechanism for moving the electromagnets up and down the tube because the range of the magnetic interaction would not extend the length of the tube, and thus, the electromagnets would have to be moved with the magnets on the electrode.

Regarding claim 20, Lorincz et al teach (see col. 6, lines 51-54) that the partitions are made of insulating material (i.e.-not electrically conductive).

Regarding claim 21, Lorincz et al teach (see col. 6, lines 62-64) that the partitions may have grooves (516) cut along the periphery of the insulators for facilitating the flow of electrolyte.

Regarding claim 22, Lorincz et al teach (see Fig. 9 and numeral 920) that the partition may include a plurality of holes for fluently introducing the electrolyte.

Regarding claim 25, Perline teaches (see col. 2, line 52-col. 4, line 9) that the driving apparatus (the electromagnets) is powered by a power device. It would have been within the expected skill of a routineer in the art to have "driven" the electromagnets to keep them in position with the fixed magnet mechanism in order to maintain the magnetic levitation effect. Though Lorincz et al are silent about the rotation of electrode, Perline teaches that the means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to cause the electrode (by means of the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing by ensuring that any defects of the electrode are not concentrated in one spot

Regarding claim 26, Perline teaches (see col. 2, line 52-col. 4, line 9) that the magnetic levitation means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to rotate the driving apparatus "by direct mechanical transmission" to cause the electrode (with the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing (by ensuring that any defects of the electrode are not concentrated in one spot thus forming a groove in the tube surface).

9. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lorincz et al in view of Pelrine as applied to claims 19-22, 25 and 26 above, and further in view of Lin et al (US 6,660,138).

The teachings of Lorincz et al and Perline are described above in paragraph no. 8. However, Lorincz et al and Perline do not teach that there is a screw mechanism is attached on an end of the electrode assembly for removal of air bubbles.

Lin et al teach (see col. 3, line 23 to col. 4, line 6) that a propeller means is added to an electrode for electropolishing the inside surface of a tube for the purpose of exhausting air bubbles generated by the electrolytic reaction.

Therefore, it would have been obvious to one of ordinary skill in the art to have added the propeller of Lin et al to the electrode assembly of Lorincz et al for the purpose of exhausting air bubbles generated by the electrolytic reaction.

[Lin et al is currently commonly owned by the current assignee. Therefore, a statement on the record that the two inventions were subject to common ownership at the time of the invention is required to remove this reference as eligible prior art under 35 USC 102(e)(1).]

10. Claims 27-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lorincz et al in view of Pelrine as applied to claims 19-22, 25 and 26 above, and further in view of Aiura et al (EP 951960) and Sakata et al (US 4,561,185).

The teachings of Lorincz et al and Perline are discussed above in paragraph no. 8. However, Lorincz et al and Perline do not teach plural closed fillisters being placed

on the second partition, wherein the fillister includes a flexible element and a protruding object supporting an abrasive for grinding the inner surface.

Aiura et al teach (see Fig. 3 and paragraph 37) the grinding of the inner surface of a tube by means of abrasives that are pushed against the inner surface.

Sakata et al teach (see col. 6, lines 34-59) using a thimble and spring set-up to apply a constant pressure.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a grinding apparatus, such as that disclosed by Aiura et al to the apparatus of Lorincz et al and Perline because the apparatus of Aiura et al provides for (see abstract) high precision polishing, and it would have been obvious to one of ordinary skill in the art to have used the thimble and spring set-up (fillister) of Sakata et al to apply pressure behind the abrasive elements because the thimble-spring provides a constant pressure thus making the grinding more uniform.

Regarding claim 28, Lorincz et al teach (see col. 6, lines 51-54) that the partitions are made of insulating material (i.e.-not electrically conductive).

Regarding claim 29, Lorincz et al teach (see col. 6, lines 62-64) that the partitions may have grooves (516) cut along the periphery of the insulators for facilitating the flow of electrolyte.

Regarding claims 30 and 31, Sakata et al teach (see col. 6, lines 34-59) using a spring and thimble set-up.

Regarding claim 32, though Aiura et al do not teach the composition of the abrasive, it would have been within the expected skill of a routineer in the art to have

chosen a conventional abrasive, such as alumina ($Al_2O_3$). (For support see paragraph spanning cols. 5 and 6 of Tomari et al.)

Regarding claim 33, Perline teaches (see col. 2, line 52-col. 4, line 9) that the driving apparatus (the electromagnets) is powered by a power device. It would have been within the expected skill of a routineer in the art to have "driven" the electromagnets to keep them in position with the fixed magnet mechanism in order to maintain the magnetic levitation effect. Though Lorincz et al are silent about the rotation of electrode, Perline teaches that the means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to cause the electrode (by means of the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing by ensuring that any defects of the electrode are not concentrated in one spot

Regarding claim 34, Perline teaches (see col. 2, line 52-col. 4, line 9) that the magnetic levitation means provide six degrees of freedom (x-y-z Cartesian coordinates and rotation about each of these axes) and it would have been obvious to rotate the driving apparatus "by direct mechanical transmission" to cause the electrode (with the fixed magnet mechanism) to rotate in order to ensure a more uniform electropolishing (by ensuring that any defects of the electrode are not concentrated in one spot thus forming a groove in the tube surface).

Regarding claim 35, Lorincz et al teach (see Fig. 9 and numeral 920) that the partition may include a plurality of holes for fluently introducing the electrolyte.

***Response to Arguments***

11. Applicant's arguments filed 2 January 2004 have been fully considered but they are not persuasive. Applicant argued that:

a. Lin et al (US 2003/0098245) does not qualify as prior art.

In response, the Examiner is aware that Applicant has claimed priority to a foreign application and that such priority document has been filed. However, in order to accord the present Application with the effective filing date of the foreign priority, Applicant are required to submit a certified English translation thereof. Please see MPEP 201.14.

b. There is no motivation to combine the references.

In response, the Examiner disagrees. There is motivation to combine the teachings of Perline with both the disclosure of Lin et al (Application 10/076289, Patent 6,660,138) and Lorincz et al. The magnetic levitation device of Perline provides easy and precise manipulation of a device in three dimensions and with the additional benefit of zero friction. This is an express motivation to combine the disclosure of Perline with other prior art references. Aiura et al teach adding a grinding abrasive pushed against the inner surface of a tube to effect grinding and Sakata et al teach using a thimble and spring set-up to apply a constant pressure. Thus, Aiura et al provides the express motivation of providing grinding of the inner surface of the tube and Sakata et al provides the implicit motivation that the constant pressure means would provide an accurate and even grinding of the entire tube surface.

***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw

ROY KING
SUPERVISORY PATENT EXAMINER
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